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Improved Handling of

FROZEN FOODS

In Retail Stores

- Loading at Warehouse
- Delivery to Store
- Price Marking
- Display

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The study on which this report is based is part of a larger research project designed to improve operations of retail food stores. The work is being conducted under the general supervision of R. W. Hoecker, Head, Wholesaling and Retailing Section, Transportation and Facilities Branch, Marketing Research Division, Agricultural Marketing Service. The project is financed from appropriations under Agricultural Marketing Act of 1946 (RMA, Title II).

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IMPROVED HANDLING OF FROZEN FOODS IN RETAIL STORES

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SUMMARY

Improved methods of receiving, price-marking, and displaying frozen food, as well as improved equipment, were tested in 3 retail stores. The results were labor productivity increases of 31, 36, and 44 percent over conventional methods and equipment. With improved methods the total labor requirements were 3.0 to 3.7 minutes per carton handled.

Time study techniques were used to measure productivity of conventional handling methods, and an attempt was then made to increase productivity in each operation through improved procedures.

Three methods of filling store orders were studied. The time required to select an order and load it into insulated shipping containers was almost twice the time required for selecting individual store orders by cartons for refrigerated truck delivery. Handling insulated shipping containers required considerably more time than refrigerated truck delivery of individual cartons. The insulated containers also caused congestion in the stores. The best method of handling these containers was to unload them as received and to stack them as emptied. The savings made by selecting orders for 4 or 5 stores at one time and loading them into trucks by commodities was more than offset by the additional time required to segregate the orders at the stores.

Stores with reach-in freezer storage space required more handling time than those with walk-in freezers. With the walk-in units, the best method was to keep the merchandise segregated and plainly marked and to pull hand trucks into the freezer to load and unload. It was also found advisable to load carts in the same order in which the merchandise is to be displayed.

Three stamps were tested for price-marking frozen food--an adjustable band stamp and pad, a self-inking adjustable band stamp, and a set of multi-impression stick stamps. The adjustable band type stamp was 8.5 percent more productive than the band and pad stamp, and the multi-impression stamps were 66 percent more productive than the band and pad stamp.

Two methods of price-marking were developed which were improvements over the conventional method of price-marking each layer of packages as they were placed in the case. The multi-impression stamp set was used in all methods.

In one method the carton was split lengthwise, and the ends of the packages were price-marked. This was 25.7 percent more productive than conventional methods of price-marking. It was especially effective because the ends thus exposed are usually frost-free. Another method was to slide the opened case against a sloped board so that the packages were arranged in a series of steps, and could be price-marked on the face. This was 3.3 percent more productive than conventional methods.

Price-marking in the backroom had several advantages: (1) It reduced the time in front of displays by half; (2) the operator had a better opportunity to price-mark the package before frost formed; (3) it permitted the operator to work at a convenient height; and (4) it gave the operator one place for all his equipment and records.

Special dividers were devised as part of the study to improve the display operations. These dividers of solid material were placed between the rows of merchandise. They had the following advantages: (1) Time was saved in stocking; (2) cases were kept neat and policing time was saved; (3) rotation was simplified; (4) it was easier for the customer to select the item; (5) in some cases the dividers saved space; and (6) they aided clerks in taking inventories. The use of split cartons and the special dividers resulted in an increase in production for displaying of 31.9 percent.

Dump displays proved to be effective in handling fast-moving items. This practice reduced the time requirement by 87.2 percent.

In disposing of cartons, less time was required to break down cartons the contents of which had been price-marked with the slopeboard than to break down cartons the contents of which had been conventionally marked. The split cartons required more time than the others. Empty cartons the contents of which had been price-marked in the backroom, and also split cartons, were best collected without further breakdown. This was feasible because of the relatively short time spent at the display cases.

BACKGROUND OF THE STUDY

Frozen food is the basis of a new but rapidly growing department in the modern food store, and partly because of this, handling methods are often poor and labor productivity low. All too often the handling of frozen food, if not the merchandising of it, is neglected in the retail store.

The U. S. Department of Agriculture conducted a series of studies in 7 supermarkets and 3 chainstore warehouses for the purpose of improving methods of handling frozen food. A number of improved methods and some improved equipment were developed as a result of these studies. The improvements were installed in 3 supermarkets, and store personnel were trained in their use. Comparisons were then made with conventional operations by means of time study procedures. ^{1/} In addition, comparisons were made of the various

^{1/} Complete detailed time standards for all operations reported are available on request.

methods of truck delivery, and order filling was observed in the 3 warehouses. Improvements in these methods were developed and tested.

ORDER FILLING AND DELIVERY

Filling the Order

Studies were made at frozen food warehouses of 3 different methods of filling orders from retail stores. In one method, each store's order was selected directly into insulated shipping containers. 2/ In another method, each store's order was selected by cartons and placed on 4-wheel carts as the order filler moved through the frozen food storage area. The orders were then delivered in refrigerated trucks. In the third method, orders for 4 or 5 stores were combined and assembled by truckloads. These orders were loaded onto trucks and later segregated at the stores.

Standard time 3/ to select, move to loading dock, and check individual store orders when insulated shipping containers were used was 0.681 man-minute per carton (table 1). The equivalent time for refrigerated truck delivery when the 4-wheel hand truck was used was 0.496 man-minute per carton. In the limited studies of the third method, 0.491 man-minute per carton was required. The additional time required to segregate the orders at the stores more than offset any savings in selecting the order by the third method. These times will vary somewhat owing to variations in layout of the warehouse.

Loading Order on Delivery Trucks

When a frozen food order was assembled in insulated shipping containers, loaded on 4-wheel carts, and pulled directly into the truck and unloaded, the loading time was 0.078 man-minute per carton. This was about the same as that required (0.075 man-minute per carton) when individual cartons were loaded from a cart inside the truck. Fewer units were individually handled when the insulated shipping containers were used than when individual cartons were loaded. However, two people were required to unload and stack each container, whereas one person could load and stack individual cartons.

Two methods of loading a truck were studied whereby the cartons were passed by hand from a rear platform into the truck. In one system (fig. 1) requiring 0.174 man-minute, the entire order for 5 stores was loaded into the truck and stacked by items, and segregation took place at the store. An improvement was made in this operation: Each store's order was selected individually; and as it was loaded in the truck, it was kept separate with a canvas *drop cloth*. This method required 0.150 man-minute--less handling time per carton than the previous method. In addition, the method increased the truck capacity by about a third.

2/ The shipping containers used in these studies had solid walls padded with insulating material, were noncollapsible, and carried an average of 6 cartons each.

3/ Standard time: The time taken by a qualified operator, working at a normal pace, to do a particular operation, adding allowance for such factors as personal time and fatigue.

Table 1.--Standard man-minutes per carton to select, order, load, and unload trucks for several methods of handling, based on an average order of 28 pieces

Operation	Insulated shipping containers		Refrigerated trucks		
			Unsegregated:	Segregated orders	
	No loading : platform : at store	Loading : platform : at store	orders : individually : loaded	Individually : loaded	Loaded with : 4-wheel : truck
	<u>Man-minutes</u>	<u>Man-minutes</u>	<u>Man-minutes</u>	<u>Man-minutes</u>	<u>Man-minutes</u>
Selecting and checking order, and moving it to loading dock <u>1/</u> . . .	0.681	0.681	<u>2/</u> 0.491	0.496	0.496
Loading trucks <u>3/</u> . . . .	.078	.078	<u>2/</u> .174	<u>2/</u> .150	.075
Unloading truck at store and checking in order <u>3/</u> . . . . .	.281	.152	<u>4/</u> .474	<u>4/</u> .290	<u>4/</u> .290
Total standard time	1.040	0.911	1.139	0.936	0.861

1/ Includes 33.3 percent personal and fatigue allowance normal for work in low-temperature freezers.

2/ Gross time including delays for entire operation.

3/ Includes 15 percent personal and fatigue allowance.

4/ Includes store personnel time.

Unloading Delivery Trucks at Store

In unloading insulated shipping containers from trucks at retail stores the shortest time of 0.152 man-minute per carton resulted when a platform level with the truckbed was available. To unload, the truck driver slid the insulated shipping container across the bed of the truck and into the receiving area of the store. Unloading insulated shipping containers onto carts for pushing into the store required 0.281 man-minute per carton.

When refrigerated trucks with several unsegregated store orders were unloaded, an employee of the store stood at the tailgate of the truck and called out each item on the order sheet. The driver passed the item to the rear of the truck where store personnel loaded it onto a hand truck. This required 0.474 man-minute per carton. With the same truck and personnel, but with the individual store orders segregated, it was possible to unload the truck in approximately half the time, or 0.290 man-minute per carton. This method reduced the labor and the danger of thawing, since the refrigerated truck door was open a shorter time.

HANDLING IN RETAIL STORE

Once the frozen food order is delivered to the retail store, the handling is done by store personnel. However, the manner in which the product is delivered is one of several factors which affect retail store handling time.

Use of Insulated Shipping Containers in Retail Stores

Orders delivered in insulated shipping containers required 27 and 40 percent more handling time at the store than the 0.805 man-minute per carton when individual cartons were delivered by refrigerated truck (table 2). The containers also caused congestion in stores and required considerable storage space (fig. 2). Time was saved and congestion minimized by unloading the insulated shipping containers in the backrooms, and stacking them.

Handling in Backroom Storage Facilities

Backroom storage facilities in a retail food store normally were used for only about two-thirds of the frozen food received. With 2 deliveries a week, good handling methods made it possible for approximately a third of the frozen food to go directly into the display

Figure 1.--Orders for several stores are loaded in a refrigerated truck by commodities, and are segregated at the stores. Considerable space is lost in the truck by this method.

cases. The reach-in and the walk-in types of refrigerated storage facilities were evaluated.

A relatively great amount of time was required to store frozen food in the reach-in type of refrigerated units. Usually stores with reach-in freezers had less refrigeration space available than those with walk-in units. Furthermore, there was a tendency for miscellaneous materials to collect in front of the doors to reach-in units, necessitating considerable policing. The design of reach-in freezers required considerable breaking of cartons, as loose packages were stored to make use of the available space.

Three general methods of storing frozen food in walk-in storage units were observed. The most man-hours were required when the carts were parked outside and one man stood outside the cooler and passed the merchandise to a second man in the cooler. Fewer man-hours were required when only one man unloaded the merchandise from a cart parked outside the freezer. The fewest man-hours were required when one man pulled the cart directly into the freezer and unloaded it.

Table 2.--Comparative time per carton required to handle frozen food in retail stores when insulated shipping containers and refrigerated trucks are used for delivery

Operation	<u>Insulated shipping containers</u>		Refrigerated truck
	Taken directly	Unloaded in	delivery of
	to displays	backrooms	individual cartons
	<u>Man-minutes</u>	<u>Man-minutes</u>	<u>Man-minutes</u>
Receiving			
Driver	0.244	0.244	0.104
Store personnel. . . . .	.0	.0	.163
Store handling			
Handling of insulated shipping containers . . .	.227	.116	.0
Unloading carton from insulated container . . .	.0	.095	.0
Travel other than moving insulated shipping containers . . . . .	.052	.088	.088
Obtaining and opening carton . . . . .	.274	.193	.193
Disposal of empty carton. . . . .	.181	.126	.126
Miscellaneous handling on carts . . . . .	.0	.026	.026
Affected times.	0.978	0.888	0.700
Personal and fatigue time 15 percent . . . . .	.147	.133	.105
Total affected standard time	1.125	1.021	0.805

One of the most important factors in handling frozen food in storage freezers was to keep the commodities segregated and stored in an orderly fashion. When cartons are stored in the freezer the labels on some cartons are not visible. By marking the commodity code number on these cases with chalk as the merchandise is stored, clerks can reduce the freezer handling time considerably (fig. 3).

Price-Marking Frozen Food

In conventional methods, price-marking was done at the display case. Most operators used the self-inking adjustable band stamp, although in one firm an adjustable band stamp and ink pad were used. The carton was opened at the top by pulling the flaps open. The operator price-marked the exposed layer of packages or cans and then laid down the stamp and pad and placed the layer of merchandise in the display case. He then picked up the stamp and repeated the operation on the next layer (fig. 4). This resulted in several



Figure 2.--Insulated shipping containers created congestion in backrooms.

handlings of the stamp and pad for each carton. The stamp required adjustment for most cartons. The adjustment time was reduced by using 2 sets of stamps, one for multiple prices, the other for individual prices.

In one firm, the 25 most frequently used prices covered 98 percent of the frozen items sold. A multi-impression stick stamp set of approximately 30 stamps was obtained for these prices, and the adjustable stamps were used only for the remaining 2 percent (fig. 5). ^{4/} The adjustable self-inking band stamp was 8.5 percent more productive than the adjustable band stamp and pad and the multi-impression stick stamps were 66 percent more productive than the adjustable band stamp and pad (table 3).

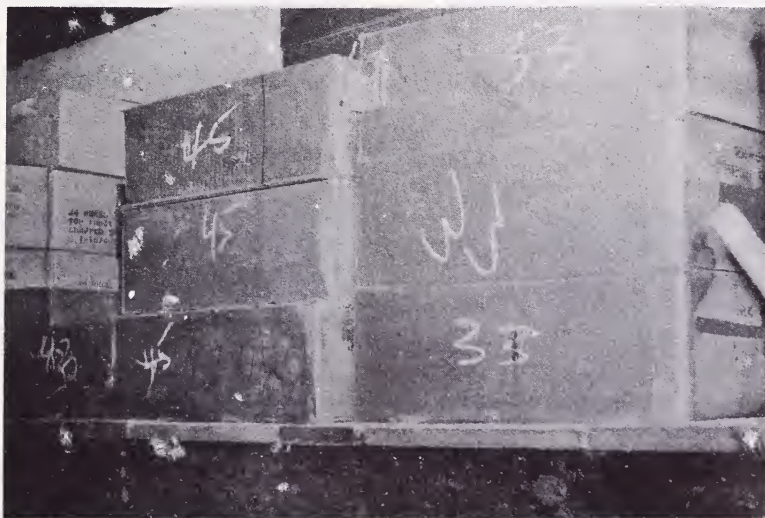


Figure 3.--Code numbers identify commodities in storage freezers.

^{4/} See table 10 in Appendix for the frequency of use of certain price stamps.



Figure 4.--Two steps in the conventional method of price-marking and stocking frozen foods.



A.

B.

Figure 5.--A, The multi-impression stamp set is used to price-mark frozen foods in the backroom. B, Cans show the price marks that were applied with the multi-impression set.

Table 3.--Time to obtain and adjust stamps, and to price a carton of frozen food, using conventional methods with 3 types of stamps

Type of carton	: Adjustable band : stamp and pad 1/	: Adjustable self-inking band stamp 1/	: Multi-impression stick stamp set
	: <u>Man-minutes</u>	: <u>Man-minutes</u>	: <u>Man-minutes</u>
Pasteboard - 3 layers, 8 packages per layer .	: 0.412	: 0.379	: -
Cans - 1 layer of 24 .	: .353	: .310	: 0.235
Cans - 2 layers of 24 .	: .549	: .529	: .302

1/ Includes average of 0.081 man-minute per carton to adjust stamp.

With the band-type stamp the operator can stamp through a very light frost formation and still obtain an acceptable impression. This was not possible with the multi-impression stick stamp. However, where the frost was light enough to stamp through, it was also light enough to be removed with the thumb, and by wiping with the thumb ahead of the stick stamp the time was less than by the use of the band stamp.

The primary difficulty in price-marking frozen food is that frost forms on the packages and prevents the ink from reaching the surface. Attempts to stamp through the frost resulted in blurred or smeared price marks. To obtain a clear impression it was necessary to wipe off the front on each package or can. This was difficult when the frost was thick.

The edges of the packages that were not against the outside of the carton generally were not frosted, and a method was developed of splitting the carton to expose these unfrosted edges (fig. 6). The operator lifted one flap and pulled the ends away from the packages to prevent cutting them when the carton was cut down each end. The carton was then broken lengthwise either over the rail of the display case or the end of a table (fig. 6, C). The operator could then price-mark the unfrosted surfaces. With this method, which requires rapid marking, the porous rubber multi-impression stick-type stamps were especially successful. This method was 25.7 percent more productive than conventional methods of pricing (table 4).

In some cartons where frost-free surfaces could not be found, as in cartons of cans one layer deep, wiping the surface was sometimes still necessary. The solvent used for cleaning the stamps can be used also for wiping off the frost. The operator dips his thumb or a cloth in the solvent and wipes the cans with one hand, then stamps on the mark with the other.

As some merchandisers object to end marking, an alternate method of marking the upper right-hand corner of pasteboard packages was studied. This required 0.516 man-minute per carton, and while not so fast as the end method (0.424 man-minute per carton), it was still considerably faster than the conventional methods at 0.533 man-minute per carton (table 4). It was most effectively used in the backroom. The operators opened the top and one side of



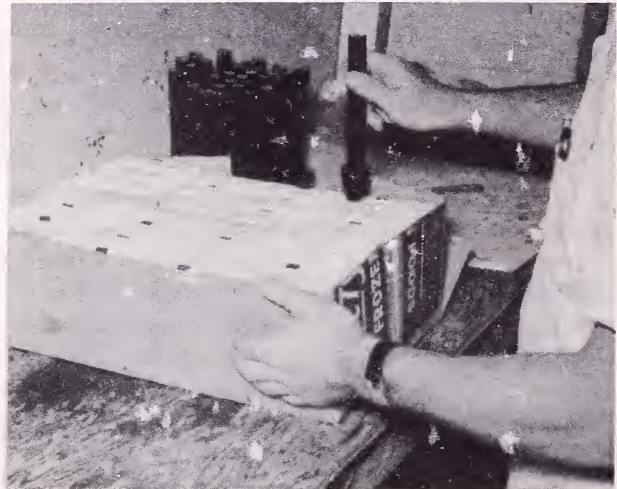
A.



B.



C.



D.

Figure 6.--Splitting cartons to obtain frost-free surfaces. A, The operator lifts a side flap. B, Holding the carton away from the contents, he splits the end vertically. The other end is then split. C, The operator breaks the carton lengthwise over the edge of the table. D, He then price-marks the unfrosted surfaces with a multi-impression stick-type stamp.

the carton and slid the contents against a sloping board fixed to the table. As the carton hit the slopeboard the top layers of packages slid further than the bottom layers, providing a stepped series of packages with the right side of each package exposed for pricing (fig. 7). This was 3.3 percent more productive than conventional methods.

Table 4.--Time required per carton to price-mark pasteboard frozen food cartons by 3 methods using the multi-impression stick stamp set

Affected element	: Stamp by layers (face price) (conventional)	: Split cases (end price)	: Slopeboard (face price)
	: <u>Man-minutes</u>	: <u>Man-minutes</u>	: <u>Man-minutes</u>
Open carton	0.190	0.210	0.238
Stamp . . . . .	.288	.159	.223
Disposal of carton unbroken . . .	.055	.055	.055
Total affected time.	0.533	0.424	0.516

Price-marking frozen food in the backroom proved to have several advantages: (1) It reduced the time spent by the operator in front of the displays by approximately half, thus removing a major obstruction in the aisles and in front of the display cases; (2) the operator had more time to price-mark the package before the frost formed; (3) it permitted the operator to work at convenient heights and in less awkward positions than is usual at the display cases; and (4) it gave the operator one place for all of his tools, equipment, and records.

In the test stores a small table large enough to hold one case for price-marking, a stamp set, and the remainder of the equipment and records were located near the low-temperature freezer door (fig. 8). The operator loaded a cart with cartons from the freezer and moved this cart near the table. One by one he moved the cartons to the table, price-marked them, and placed them on another cart. After marking a load, he moved the cart to the display cases. With the split-carton method, half cartons of some merchandise were handled without loss of time for returning the extra half. The cartons were completely separated in the backroom and the extra half returned to the storage freezer immediately. This prevented the thawing commonly found in the half-carton returned to the freezer.

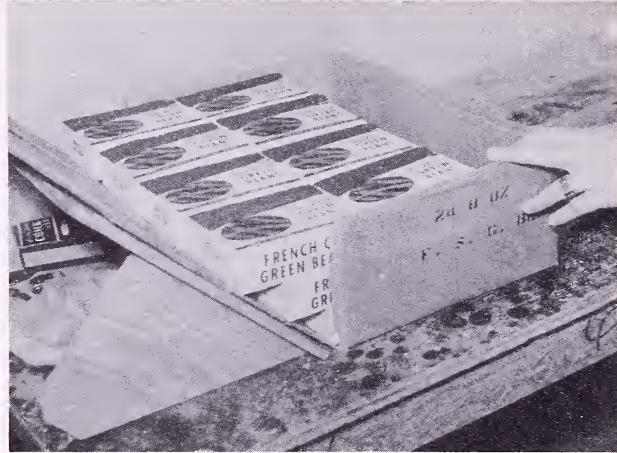
Stocking or Displaying Frozen Food

The major problem in displaying frozen food was the tendency of the packages and cans to slide around in the case. This overhanging or tipping of rows of merchandise causes binding in the case and makes moving merchandise into or out of the display case difficult. It also results in disorderly displays unless constant attention is given and the merchandise is stacked so that all rows are always equally full. To do this requires an excessive amount of labor.

The dividers produced by most display equipment manufacturers did not alleviate this problem. In general, such dividers required an excessive amount of space in the case, and



A.



B.



C.



D.

Figure 7.--Slopeboard method of price-marking food. A, The operator opens the top and one side of the carton. B, The contents are slid against a sloping board attached to the table. C, The price is stamped on the stepped series of packages. D, The packages in the other half of the carton are marked in a similar manner.

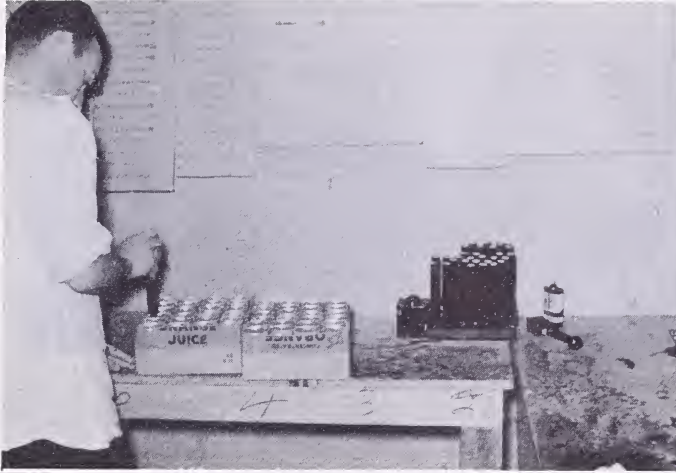
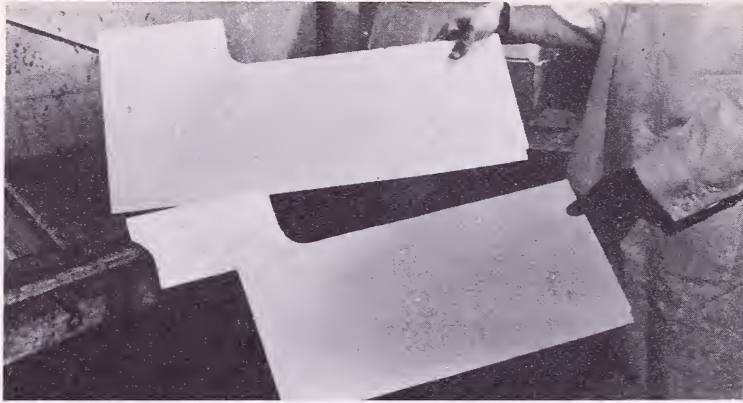


Figure 8.--Workplace for price-marking in backroom. The table is of a convenient height and there is room for equipment nearby.

blocked the view; and packages tended to hang in the openings in the dividers, making display even more difficult. Special dividers were developed which were made of thin sheets of smooth enameled oil-tempered hardboard, or of sheet fiberglass (figs. 9 and 10). Both materials were satisfactory, although the fiberglass is preferable because of its color and thinness. These dividers were placed between the rows of merchandise and were not attached to the case. The merchandise kept the dividers upright. The dividers were about 3 inches lower than the full line. About one carton of merchandise could be displayed above the dividers. Because the dividers were free in the case, the operator could adjust them in relation to the varying sizes of the packages.

Extra space for stocking can be obtained by pulling two dividers apart temporarily. This same space is available for stocking the adjoining rows of merchandise. A sufficient number of the new dividers to separate the rows of merchandise each from the other in the case usually occupied no more space than 2 or 3 of the older type. Space was sometimes gained, because the even rows of merchandise obtained with these dividers eliminated space allowed for overhang of packages or cans. These dividers have the following advantages:

1. Stocking is much easier. Cans will slide into position once they are placed between the two dividers. Packages can be moved freely into position without catching on other packages or on the wire in conventional dividers.
2. Cases are kept in order by the dividers, as packages and cans do not topple or slide. Less time is spent in policing or straightening the case (table 5).
3. Rotation is simplified. With cans rotation consists of merely scooping the remaining portion of the display to the front with one hand.



A.

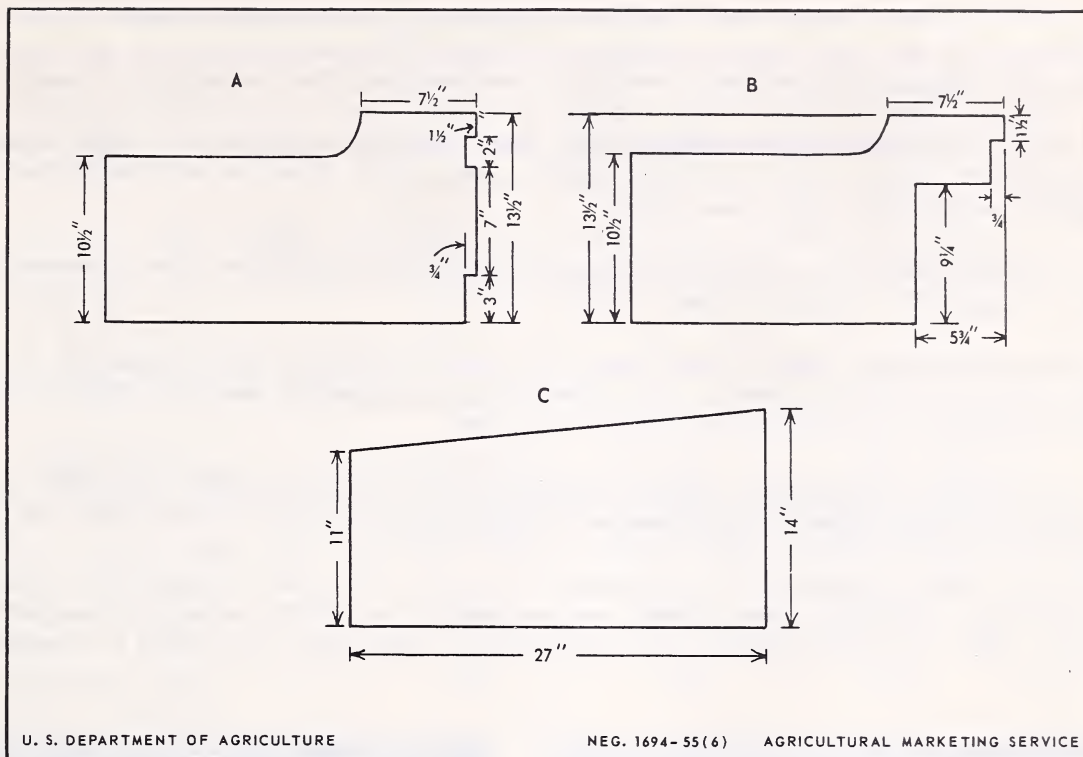


B.



C.

Figure 9.--A, Special dividers for one type of display case. B, The dividers separate rows of cans. C, The dividers keep the packages in line.



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Figure 10.--Shape and dimensions of dividers for frozen food cases. The dividers may be made of fiberglass sheet or of oil-treated presswood board that is smooth on both sides. A and B dividers are suitable for a type of case with an overhang. Divider A fits away from the fan box. Divider B fits at the fan box. Both A and B should be one-half inch shorter than the case width in order to provide clearance in fitting under the overhang. C, A divider suitable for the new open-type case.

Table 5.--Time spent to police display cases with and without special dividers

Store	Time per carton spent policing (without dividers)	Time per carton spent policing (with dividers)	Saving per carton
	Man-minutes	Man-minutes	Man-minutes
A	0.121	0.042	0.079
B . . . . .	.111	.071	.040
C ^{1/} . . . . .	.748	.345	.403
D . . . . .	.498	.129	.369

^{1/} Older style cases with more crowded displays.

4. The customer can get the item out of the display more easily, because wedging is eliminated and the items slide out readily. In conventional display cases it is often difficult to obtain an item from a row of merchandise lower than the adjoining rows.

5. Solid dividers often conserve space. Some rims have a tendency to extend beyond the can below. If the rows are allowed enough space so that items are not locked into the displays, considerable space loss results.

6. The dividers were an aid in taking inventories of merchandise. The operators used them as a gage for counting packages of various sizes.

The conventional method of handling, which combined display and pricing, was to price-mark the cartons on hand trucks parked next to the display case, and then transfer the merchandise to the case 1 or 2 pieces at a time.

The display operation was improved by opening the cartons by either the split carton or the slopeboard method. Full cartons were put directly into the display cases, the operator using both hands to transfer the contents of the carton into their proper place. One hand, usually the left, picked up 2 or 3 packages or 2 cans by the ends and positioned them for the other hand. The other hand grasped the packages in the middle and thrust them into the display (fig. 11). When packages were displayed, the items had to be placed in position.



A.



B.

Figure 11.--Improved methods of displaying cans and pasteboard packages from split cartons that are placed inside the case. A, The left hand picks up 2 packages by the ends and positions them for the right hand. B, Both hands are used to move the cans from the carton to the case.

Cans could be released as soon as they were between the dividers and the dividers would guide the cans into a proper location. Split cartons were placed on the top of the adjoining displays or dividers if the displays were low. With pasteboard items priced with the slopeboard, the carton was placed in the case with the flap toward the front, and this flap was folded over the front of the case and held in place by pressure of the hip of the operator.

The use of these methods with split cartons and dividers reduced the time by 24.1 percent and thus increased production in the stocking of the merchandise by 31.9 percent (table 6).

Table 6.--Time per carton required to display frozen food by conventional and by improved display methods for several types of cartons

Type of carton	Conventional	Improved	Time saved per carton	
	<u>Man-minutes</u>	<u>Man-minutes</u>	<u>Man-minutes</u>	<u>Percent</u>
Pasteboard - 3 layers, 8 packages per layer	0.956	0.697	0.259	27.1
Pasteboard - 4 layers, 6 packages per layer . . . . .	.931	.700	.231	24.8
Pasteboard - 2 layers, 6 packages per layer . . . . .	.514	.390	.124	24.1
Cans, 2 layers, 24 per layer. . .	1.340	1.049	.291	21.7
Cans, 2 layers, 12 per layer. . .	.771	.595	.176	22.8
Average for 5 types of carton			0.216	24.1

Dump displays were especially effective in reducing display time. By this method displays were filled quickly without blocking (table 7). Dump displays required at least the space of 3 regular rows of merchandise to be effective and required more case space for an equivalent quantity of merchandise.

Table 7.--Time to display cartons of 24 6-ounce cans of frozen juices by several methods

Method	Display time	Time saved over that required	
	<u>per case</u>	<u>by conventional method</u>	
	<u>Man-minutes</u>	<u>Man-minutes</u>	<u>Percent</u>
Conventional method	0.760		
Improved method with dividers . .	.498	0.262	34.5
Dump display . . . . .	.097	.663	87.2

The disposal of empty cartons was a fairly important part of frozen food handling. Cartons should be nested as much as possible without breaking them when split-carton methods are used. Because the time at the display case is relatively short, it was recommended the operator leave cartons on the floor when there was no space in the cart. When it is desirable to break down split cartons the operator should tear the corner and bottom in a continual motion. Even though this was faster than the conventional method of tearing each corner separately, the split carton still required the most time to break down (table 8).

Table 8.--Time required per carton for handling empty frozen food cartons in retail stores

Operation	: Dispose of carton : without breaking	Break down carton		
		Conventional	Split-carton	Slopeboard
		method	method	method
	<u>Man-minutes</u>	<u>Man-minutes</u>	<u>Man-minutes</u>	<u>Man-minutes</u>
Break and flatten . .	-	0.159	0.173	0.104
Dispose of in aisle .	0.051	-	-	-
Pick up empty carton :	.028	-	-	-
Place in trash . . .	.076	.063	.063	.063
Total time . . .	0.155	0.222	0.236	0.167

Results of Adapting Improved Methods and Equipment in Three Stores

Improved methods and equipment increased production over the best conventional methods by a third in 3 stores where complete before-and-after time studies were made (table 9).

In the 3 stores, the clerk was taught improved methods for all phases of handling frozen food. Freezers were reorganized and kept orderly, more complete records were kept; backroom price marking by splitting the cartons was adopted; individual stamp sets and new dividers were provided; and improved display methods were used. Dump displays were used frequently both before and after improvements in Store A and to a limited extent in Store B. No dump displays were used in Store C. The personnel were skilled in both conventional and improved methods and generally followed recommended practices in both the conventional and the improved methods, although in no case do these studies represent 100-percent adherence to the listed recommendations. A list of the recommended practices given to store personnel is included in the Appendix.

The improved operations required a total handling time for frozen food of 5.0 to 6.1 hours per 100 cases handled, compared with 6.5 to 8.8 hours for the conventional methods.

Table 9.--Man-minutes per carton for handling frozen food in 3 different supermarkets by conventional and by improved methods and equipment

Operation	Store A		Store B		Store C	
	Conven-	Improved	Conven-	Improved	Conven-	Improved
	tional		tional		tional	
	Man-	Man-	Man-	Man-	Man-	Man-
	minutes	minutes	minutes	minutes	minutes	minutes
Receiving	0.335	0.230	0.235	0.160	0.217	<u>1/</u> 0.217
Placing in the freezer. . . . .	.151	.151	.157	.125	.439	.138
Removing from freezer . . . . .	.326	.225	.569	.347	.412	.234
Price-marking . . . . .	.348	.197	.324	.241	.346	.195
Other backroom operations . . . . .	.022	.444	-	.374	.048	.447
Display <u>2/</u>. . . . .	.785	.489	.943	.649	1.101	.817
Policing cases. . . . .	.121	.042	.111	.073	.748	.345
Other time at cases . . . . .	.652	.232	.879	.299	.699	.167
Travel time . . . . .	.109	.088	.159	.095	.224	.226
Disposal of empty cartons . . . . .	.083	.075	.103	.089	.167	<u>3/</u> .196
Inventory and records . . . . .	.477	.436	.586	.543	<u>4/</u> .191	.227
Total time per carton.	3.409	2.609	4.066	2.995	4.592	3.209
Personal and fatigue time . . . . .	.511	.391	.610	.449	.689	.481
Standard time per carton <u>5/</u>	3.920	3.000	4.676	3.444	5.281	3.690
Time per carton spent at display case	2.502	1.378	2.952	1.456	3.741	2.316
Cartons per man-hour.	15.3	20.0	12.8	17.4	11.4	16.3
Percent increase in production		30.7		35.9		43.9

1/ No attempt was made to change receiving methods in this store.

2/ Differences in display time are due to the amount of dump display permitted and the size of individual displays.

3/ It was necessary to break down cartons in this store and a better job was done in the improved operation.

4/ No records had been kept previously in this store, and the result was faulty ordering and much extra handling and travel.

5/ Differences in stores are due to variations such as amount of available display space, quantities and types of merchandise handled, and layouts of stores.

APPENDIX

INSTRUCTIONS GIVEN TO STORE PERSONNEL 5/

Recommendations to Store Managers Who Supervise Frozen Food Departments

1. Make one man responsible for frozen food.--In only a few stores are frozen food departments large enough to require full-time personnel. Therefore, there is often a tendency to use for handling frozen food anyone who is not working. This results in considerable confusion, lost stock, and disorderly displays. The first requirement of a good department is to make one person responsible for it.

2. Teach him to do the job properly.--This person should make out the orders, receive the loads, build the displays, and do most, if not all, of the stocking. If he is expected to do the job effectively, he should be taught how. It is usually necessary for him to have several other duties in addition to his work on frozen food.

3. Check periodically to see that the job is done right.--Follow-up is essential in the success of any operation.

Recommendations to Store Personnel for Handling Frozen Food

A. Receiving

1. Be ready for the load.†-A third or more of the delivery driver's time at the store was spent waiting for the store personnel to receive the load. By having a definite time for deliveries and by requiring the store personnel to be ready to receive the load, the delivery operation can be speeded considerably and congestion reduced around back doors and alleys.

2. Segregate items that can go directly into the display cases.--Approximately a third of the items received with twice-a-week delivery can be put directly into the cases. This reduces the amount of handling and in effect decreases the amount of storage space needed. It requires that the clerk check his display cases before he receives the order.

3. Stack cartons close together.--Thawing is minimized when the items are stacked on carts with little or no air space left between cartons. This maintains the quality of the merchandise and by reducing the frost on the packages makes them easier to price-mark.

4. Unload the order quickly, and get it quickly into refrigeration again.--The quicker the order is unloaded the quicker the truck doors can be closed and the order can be put back under refrigeration. This is important from a quality standpoint. It also makes price-marking easier and reduces the load on refrigeration equipment.

5/ These instructions were given verbally and in writing to store managers and clerks when the improved operations were put into effect.

B. Handling in Storage Freezers

1. Segregate the merchandise as you put it away.--Searching for an item requires considerable time. By keeping storage freezers orderly and storing the merchandise in commodity groups, handling time was reduced a third in test stores.

2. Keep labels visible or mark the visible end of the carton.--This aids in spotting the required carton immediately. In a walk-in freezer it is possible to obtain several cartons without putting on heavy clothing or leaving the door open for long periods.

3. Push the cart into the freezer to load or unload large walk-in freezers.--By parking the cart in the freezer, or at least in the doorway, temperature rise can be prevented and less handling is required. Each carton can be placed on the cart where needed. The unloading can be done by one man.

4. Load the merchandise into the cart in the same order in which it is to be displayed.--This reduces travel at the display case. By stacking the merchandise on the cart according to the commodity sections of the display cases the operator can display all of the items in one section of the case without backtracking or moving merchandise around on the cart.

5. Keep the freezer clean and free of ice.--When ice is allowed to form in the freezers it tends to result in extra handling of merchandise, loss in effective refrigeration, loss of usable storage space. It damages merchandise, especially in paper covered packages.

6. Don't collect antiques in your freezer.--When cartons are misplaced in the freezer for long periods, they tend to be damaged or discolored. In addition, quality often suffers.

C. Care and Servicing of Displays

1. Check the display case at least twice a day.--Normal customer handling will upset displays even if they do not need to be refilled. During heavy sales periods more frequent care may be necessary.

2. Handle full or half cartons only.--Handling individual packages or returning part cartons to the backroom is time consuming and often results in damage to the packages. In most modern display cases this is not necessary if proper care is exercised.

3. Make a written list of needs as the case is checked.--The operator should make a list of needs as he moves the length of the cases. When this was not done the operator usually had to make an extra trip to get forgotten items. Considerable success was obtained from using an inventory record on which the quantity on hand in the storage freezer, the quantity displayed each time, and weekly sales were kept. The operator used this sheet to list his needs and checked them off as they were displayed. It also was useful in making out the orders.

4. Straighten out the cases while checking.--When the operator moves down the case listing needed items he can also police and straighten effectively. This makes stocking easier later on and he can better estimate his needs for new stock. Rotate the merchandise to the front and stock to the rear of the displays.

5. Watch for damaged packages and remove them.--A damaged package or can on top of a display can stop the sales from the whole stack.

6. Keep price signs clean and up to date.--This requires constant attention.

7. Keep cases clean and free of ice.--This is not done in many departments. The equipment is often blamed for excessive icing but closer examination usually shows overloaded displays or blocked air vents. Ice can damage many packages.

D. Price-marking

1. Use a good stamp set and keep it clean.--About 30 stamps would provide 95 percent of the prices necessary for frozen food in most stores. The best productivity and clearest prices were obtained by using a multi-impression stick stamp set of about 30 stamps and an adjustable stamp for the remaining odd prices.

2. Price the whole carton at once on frost-free inside edges.--Surfaces of packages and cans which were not against the outside of the carton tended to be frost-free when the carton was first opened. Practically all cartons can be split so that the inside edges of all the items are exposed. These can then be price-marked in one operation before frost forms. Open one top flap of cases containing paper-covered packages and pull the cardboard away from the packages as it is cut. Some cartons, such as some canned juices, have only one layer of merchandise. If frost forms, wipe it off so clear impressions can be obtained. The liquid used to clean stamps will remove this frost in extreme cases.

3. Price the carton quickly.--Once a carton is opened frost forms fast. Price the items immediately.

4. Price in the backroom if possible.--Pricing in the backroom has several advantages:

(a) It allows the carton to be priced before frost forms.

(b) Considerably less time is spent in front of the display cases with less blocking of aisles and displays.

(c) A proper workplace for tools and materials can be set up.

(d) Prices can more conveniently be taken from the price book.

(e) The ink can dry before the item is displayed.

E. Display

1. Use dump displays where possible.--Dump displays save considerable time for fast-moving items, and also permit the operator to sell more merchandise from a given space. The operator can keep merchandise in a relatively small display with little effort. Dump displays should not be attempted with less space than that required for 3 regular rows of placed merchandise.

2. Do not display less than half a row of an item, if consistent with merchandising practices.--With the exception of a few slower moving items such as fish fillets, where related items can be stocked together, a minimum display for handling ease is half a row. The operator can then stock a half or whole carton without returning excess merchandise to the storage freezer. It also helps prevent the covering of one item by another through customer handling.

3. Keep packages facing the front.--This results in easier handling and a better view of the package.

4. Don't stock the merchandise too tightly into the case.--Displays which are too tight take considerably longer to stock, make it difficult for customers to obtain the merchandise, and often result in torn packages and bent cans.

5. Don't backtrack in servicing.--Stock men often have to run back and forth to find a certain item. With merchandise segregated on the display cart, the operator need move the length of the case only once in filling displays.

6. Don't block the case with carts or empty cartons.--With merchandise price-marked in the backroom and segregated properly on the cart, it is often possible to park the cart away from the cases when stocking so that customers have access to the cases.

7. Combine rotation with stocking.--Move old merchandise to the front and stock to the rear of each row. Most of the moving of the old merchandise forward should be done when policing the cases prior to stocking.

8. Get the carton close to the display.--The best production was obtained when operators placed the carton directly in the case for stocking.

9. Use both hands effectively.--Frozen food can be stocked rapidly by using both hands. The best method is to lift the merchandise from the carton 2 or 3 units at a time with one hand and transfer them to the other in the proper position to be placed in the display. Special dividers and the split-carton method were a great help in stocking.

10. Keep displays below the fill line of display cases.--Building displays above the maximum fill line causes disorder and is one of the major causes of ice formation.

11. Use the improved dividers.--Special dividers were a great aid in displaying and stocking frozen food. Insert a divider between each row of the merchandise and the next.

Table 10.--Frequency with which certain multi-impression stamps were used to price-mark frozen food in one firm, January 1955

<u>Price stamp</u>	:	<u>Frequency of use</u>
<u>Cents</u>	:	<u>Percent</u>
<u>Singles</u>	:	
19	:	15.0
20	:	.0
21	:	2.2
22	:	.0
23	:	7.6
24	:	.0
25	:	18.1
26	:	.0
27	:	.0
28	:	.0
29	:	8.3
31	:	.4
33	:	.2
35	:	2.1
37	:	4.2
39	:	.7
41	:	3.3
43	:	.6
45	:	.0
47	:	5.0
49	:	<u>1/</u>
55	:	1.6
59	:	<u>1/</u>
65	:	.5
69	:	.3
75	:	.6
79	:	
<u>Doubles</u>	:	
2/23	:	4.8
2/25	:	2.2
2/29	:	13.8
2/31	:	.5
2/33	:	.8
2/35	:	5.4
Band stamp used	:	<u>1.8</u>
	:	
	:	Total
	:	100.0

1/ Less than 0.1 percent.

